

Appl. No. 09/705,101

1. (Amended) A physical vapor deposition target comprising a material with a face centered cubic unit cell, having a sputtering surface, and comprising:
a predominate <220> crystallographic texture across the sputtering surface; and
an average grain size across the sputtering surface of less than or equal to about 30 microns, the material being formed by a process including casting.
2. The physical vapor deposition target of claim 1 wherein the average grain size across the sputtering surface is less than or equal to 1 micron.
3. The physical vapor deposition target of claim 1 further comprising substantially no pores or voids proximate the sputtering surface.
4. The physical vapor deposition target of claim 1 wherein the predominate <220> crystallographic texture is a strong <220> crystallographic texture.
5. The physical vapor deposition target of claim 1 comprising a ratio of the <220> crystallographic orientation to all other orientations of the face centered cubic unit cell of at least about 80%.
6. The physical vapor deposition target of claim 1 comprising a ratio of the <220> crystallographic orientation to all other orientations of the face centered cubic unit cell of at least about 90%.

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7. The physical vapor deposition target of claim 1 wherein substantially all of the grain sizes across the sputtering surface are less than about 30 microns.
8. The physical vapor deposition target of claim 1 wherein substantially all of the grain sizes across the sputtering surface are less than 1 micron.
9. The physical vapor deposition target of claim 1 wherein the $\langle 220 \rangle$ texture comprises predominately axial $\langle 220 \rangle$ orientations.
10. The physical vapor deposition target of claim 1 wherein the $\langle 220 \rangle$ texture comprises predominately planar $\langle 220 \rangle$ orientations.
11. The physical vapor deposition target of claim 1 comprising one or more of aluminum, copper, silver, gold, nickel, brass, cerium, cobalt, calcium, iron, lead, palladium, platinum, rhodium, strontium, ytterbium, and thorium.
12. The physical vapor deposition target of claim 1 comprising one or more of aluminum, copper, gold, nickel, and platinum.
13. The physical vapor deposition target of claim 1 wherein any precipitates present in the target have a maximum dimension of 0.5 micron.

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67. (Amended) A physical vapor deposition target comprising a copper material with a face centered cubic unit cell, having a sputtering surface, and comprising:

a predominate <220> crystallographic texture across the sputtering surface;

and

an average grain size across the sputtering surface of less than or equal to about 30 microns, wherein any precipitates present in the target have a maximum dimension of 0.5 micron.

68. The physical vapor deposition target of claim 67 further comprising one or more of aluminum, silver, and gold.

69. The physical vapor deposition target of claim 68 comprising aluminum.

70. The physical vapor deposition target of claim 68 comprising silver.

71. The physical vapor deposition target of claim 68 comprising gold.

72. The physical vapor deposition target of claim 67 wherein the average grain size across the sputtering surface is less than or equal to 1 micron.

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73. The physical vapor deposition target of claim 67 further comprising substantially no pores or voids proximate the sputtering surface.

74. The physical vapor deposition target of claim 67 wherein the predominate $\langle 220 \rangle$ crystallographic texture is a strong $\langle 220 \rangle$ crystallographic texture.

75. The physical vapor deposition target of claim 67 comprising a ratio of the $\langle 220 \rangle$ crystallographic orientation to all other orientations of the face centered cubic unit cell of at least about 80%.

76. The physical vapor deposition target of claim 67 comprising a ratio of the $\langle 220 \rangle$ crystallographic orientation to all other orientations of the face centered cubic unit cell of at least about 90%.

77. The physical vapor deposition target of claim 67 wherein substantially all of the grain sizes across the sputtering surface are less than about 30 microns.

78. The physical vapor deposition target of claim 67 wherein substantially all of the grain sizes across the sputtering surface are less than 1 micron.

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79. The physical vapor deposition target of claim 67 wherein the $\langle 220 \rangle$ texture comprises predominately axial $\langle 220 \rangle$ orientations.

80. The physical vapor deposition target of claim 67 wherein the $\langle 220 \rangle$ texture comprises predominately planar $\langle 220 \rangle$ orientations.

81. (Cancelled)

82. (New) A physical vapor deposition target comprising:
a sputtering surface having an average grain size across the surface of less than or equal to 1 micron; and
a ratio of $\langle 220 \rangle$ crystallographic texture to all other crystallographic orientations of at least about 80%.

83. (New) A physical vapor deposition target comprising a material with a face centered cubic unit cell, having a sputtering surface, and comprising:
a predominate $\langle 220 \rangle$ crystallographic texture across the sputtering surface;
an average grain size across the sputtering surface of less than or equal to about 30 microns, and
wherein any precipitates present in the target have a maximum dimension of 0.5 micron.

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